

577500

FINAL REPORT: NAG5-8045 (OSP 6804400)
Scientific analysis of data for the ISTP/SOLARMAX Programs
Submitted by
Alan J. Lazarus
Senior Research Scientist
MIT Center for Space Research

This Grant supplemented our work on data analysis from the Wind spacecraft which was one of the ISTP fleet of spacecraft. It was targeted at observations related to the time of solar maximum in 2000. It was to cover the time period January 15, 1999 to January 14, 2001, but the period was modified so that it expired August, 2000 due to funding changes at Goddard Space Flight Center.

The work we proposed to do under this grant included comparison of solar wind parameters obtained from different spacecraft in order to establish correlation lengths appropriate to the solar wind and also to compare parameters to explore solar cycle effects.

The work supported in part by this grant included the following scientific studies:

- Correlation studies between ISEE 1, ISEE 3, IMP 8 and Wind were carried out by Jurac and Richardson:

Jurac, S. and J. D. Richardson, The dependence of plasma and magnetic field correlations in the solar wind on geomagnetic activity, *J. Geophys. Res.*, 106, 29,195-29,205, 2001.

- Comparisons between Wind and SoHo by Coplan, Ogilvie, and Lazarus studied the orientations of shock normals and found that their normals were between the Sun-Earth line and the direction of the magnetic field:

Coplan, M. A., F. Ipavich, J. King, K. W. Ogilvie, D. A. Roberts, A. J. Lazarus, Correlation of solar wind parameters between SOHO and Wind, *J. Geophys. Res.*, 105, 18,615, 2001.

- The establishment of an unexpected, but very clear dependence of the He/H ratio on both solar wind speed and the time in the solar cycle; that work was reported at two meetings and was published.

Aellig, M. R., A. J. Lazarus, and J. T. Steinberg, The helium abundance in the solar wind measured with Wind/SWE, *EOS* 80, S257, 1999.

Aellig, M.R., A. J. Lazarus, and J. T. Steinberg, The solar wind helium abundance over the solar cycle, *Geophys. Res. Lett.*, 28 (14), 2767-2770, 2001.

Aellig, M. R., A. J. Lazarus, and J. T. Steinberg, The solar wind helium abundance over the solar cycle, SOHO-ACE Workshop on Solar and Galactic Composition, March 6 - 9, Bern, Switzerland, AIP Conference Proceedings, 598, 89, 2001,

- Reports at the October, 2000 ISTP meeting at UCLA of observations 1) of Sunward-flowing protons after the passage of interplanetary shocks, and 2) measurements of proton anisotropies. The first topic is being pursued with support from another grant as is the second. Some results from the second study have been presented at meetings and are in press:

Kasper, J. C. and A.J. Lazarus, Wind/SWE observations of firehose constraint on solar wind proton temperature anisotropy, *Geophys. Res. Lett.*, in press, 2002.